We Claim:

1. A stable pluripotent trophoblast stem (TS) cell line.

2. A purified preparation of trophoblast stem cells which (i) are capable of indefinite proliferation *in vitro* in an undifferentiated state; and (ii) are capable of differentiation into cells of the trophoblast lineage *in vivo*.

3. A purified preparation as claimed in claim 2 which is further characterized by expression of genetic markers of diploid trophoblast cells.

4. A purified preparation as claimed in claim 2 wherein the cells are differentiated into cells of the trophoblast lineage.

5. A purified cell preparation as claimed in claim 4 characterized by expression of genetic markers of diploid trophoblast cells of the ectoplacental cone (EPC), and the secondary giant cells of the early conceptus.

6. A purified cell preparation as claimed in claim 2 or 4 which is derived from or comprised of cells that have been genetically modified either in nature or by genetic engineering techniques *in vivo* or *in vitro*.

7. A purified cell preparation as claimed in claim 6 modified by introducing mutations into genes in the cells or by introducing transgenes into the cells.

8. A method for producing a trophoblast cell line comprising culturing early postimplantation trophoblast cells or cells of a blastocyst on a feeder layer in the presence of FGF4, and a co-factor.

9. A method as claimed in claim 8 additionally comprising inducing differentiation of the cells of the cell line to cells of the trophoblast lineage by removing the FGF4, the co-factor, or the feeder layer.

10. A method as claimed in claim 8 wherein the early postimplantation trophoblast cells or cells of a blastocyst are isolated from a mammalian or marsupial species.

11. A method as claimed in claim 8 wherein the early postimplantation trophoblast cells or cells of a blastocyst are isolated from a rodent, rabbit, sheep, goat, pig, cattle, primate, or human.

12. A method as claimed in claim 8 wherein the early postimplantation trophoblast cells or cells of a blastocyst are transgenic.

13. A method as claimed in claim 8 wherein the feeder layer is a confluent fibroblast layer or a medium conditioned by primary embryonic fibroblast cells.

14. A method as claimed in claim 8 wherein the feeder layer comprises primary mouse embryonic fibroblast (EMFI) cells or STO cells.

15. A method as claimed in claim 8 wherein the FGF4 is recombinant FGF4 and the co-

factor is heparin.

16. A method as claimed in claim 8 which further comprises introducing cells from the cell line into a blastocyst or aggregating the cells with an early stage embryo to produce chimeric conceptuses or placenta.

17. A method as claimed in claim 16 wherein the chimeric conceptuses or placenta are engineered to carry selectable markers or genetic alterations.

18. A method as claimed in claim 16 wherein cell lines are derived from the chimeric conceptuses or chimeric placenta.

19. A chimeric conceptus derived from a purified preparation as claimed in claim 2.

20. A chimeric placenta derived from a purified preparation as claimed in claim 2.

21. A method for screening for potential therapeutics that modulate trophoblast development or activity comprising subjecting a purified preparation as claimed in claim 2 or claim 4 to a test substance, and comparing the effect of the test substance to a control to determine if the test substance modulates trophoblast development or activity.

22. A method for therapeutic treatment of placental defects in a mammal comprising transplanting a purified preparation as claimed in claim 2 or 4 to generate a chimeric placenta in the mammal.

23. A method as claimed in claim 22 wherein the mammal is a human.